1990 TURFGRASS PEST CONTROL

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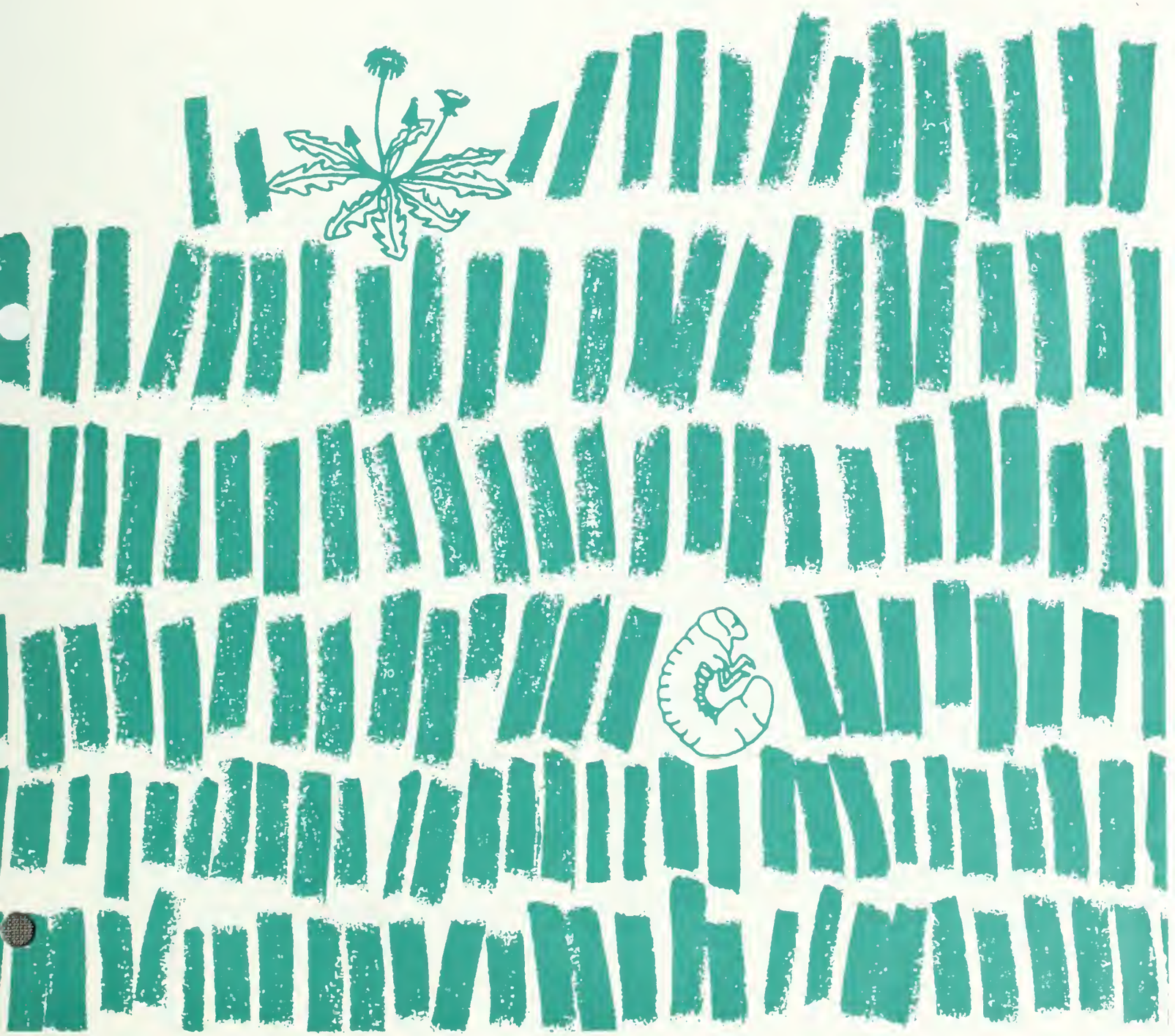

IMPROVED MANAGEMENT TECHNIQUES and new, more effective materials have made turfgrass culture a highly sophisticated technology. Proper irrigation, mowing, core aerification, thatch removal, and fertilization practices remain the principal defenses against turfgrass pests, but it is sometimes necessary to control weeds, diseases, and insects with the intelligent selection and use of pesticides.

Pesticide formulations. Pesticides are active against one or more turfgrass pests. These chemicals are generally formulated as liquid concentrates — solutions (S) or emulsifiable concentrates (EC); as wettable powders (WP); flowables (F); and as granules (G), wettable dispersable granules (WDG), and dispersable granules (DG). Liquid concentrates and wettable powders are usually added to water and applied to the turf with a sprayer. Granular materials can be applied with a fertilizer spreader.

Active ingredients. Pesticides must be accurately applied at correct rates to yield optimum results. Too little may control pests ineffectively; too much may injure the turf. The specific amount of material that should be applied depends upon the concentration of the pesticide (the "active ingredient") in the commercial preparation.

Concentration is usually expressed as a weight per unit volume or as a percent of the commercial preparation. For example, a 50 percent wettable powder is 50 percent active ingredients (a.i.) and 50 percent inert carrier. If the recommended rate of application is 12 pounds a.i. per acre, then 24 pounds of this commercial preparation are required to treat one acre. This is roughly equivalent to ½ pound per 1,000 sq. ft. (43,560 sq. ft. = 1 acre).

Liquid formulations generally list the number of pounds of the active ingredient per gallon (lb. a.i./ gal.) on the pesticide label. For example, if the concentration is 4 lb./ gal., then 1 quart of the product is required per acre to supply 1 pound of active ingredient per acre.

Precautions. Pesticides should be stored in their original containers with the label securely attached. Keep them in a cool, dry place that is inaccessible to children, pets, and irresponsible persons. **Read the label before using the pesticide and follow all instructions carefully.** A few minutes spent studying the information on the label may prevent misuse and needless accidents.

WEED CONTROL

Herbicides control one or more plant species. They may be classified into one of three types — contact, systemic, or soil sterilant — depending upon the nature of their activity on plants.

BROADLEAF WEED CONTROL IN TURF

Table 1a. — Postemergence Herbicide Control for Selected Broadleaf Weeds

All herbicides listed below should be applied when weeds are actively growing. Turfgrass species exhibit different tolerances to these herbicides. Follow label directions for appropriate turfgrass species, rates, timing, and degree of safety when used near trees and shrubs.

	2,4-D[1]	MCPP[2]	dicamba[3]	Combination of first 3 materials	2,4-D + triclopyr	2,4-D + 2,4DP	triclopyr + chlorpyrali d
black medic	..	xo	x	x	x	x	..
carpetweed	x	xo	x	x	x	..	..
chickweed							
common	..	xx	x	x	x	x	..
mouse-ear	..	xx	x	x	x	x	..
chicory	x	x	x	x	x	x	..
daisy, oxeye	xo	xo	xo	xo	..	..	..
dandelion	x	xx	x	x	x	x	x
dock, curly	xo	..	x	x	x	x	x
ground ivy	..	xo	xx	x	xx	x	xx
hawkweed	xx	..	xx	x	..	x	..
henbit	xo	xo	x	x	x	x	x
knotweed	..	xo	x	x	..	x	..
lambsquarters	x	x	x	x	x	x	..
mallow, roundleaf	..	xo	xx	x	x	x	..
pearlwort,							
birdseye	..	..	x	..	..	..	..
plantain							
broadleaf	x	..	..	x	x	x	x
buckhorn	x	..	..	x	x	x	x
purslane	xo	..	x	x	..	x	..
red sorrel	..	..	x	x	..	xo	..
speedwell,							
*creeping	..	..	..	xo	..	..	..
purslane	xo	xo	xo	x	xx	x	..
spurge, prostrate	..	xo	xx	x	x	xx	..
thistles	xx	xo	x	xo	x	x	x
violet	..	..	..	..	xx	xo	xx
white clover	xo	x	x	x	x	x	x
wild carrot	x	xx	x	x	x	x	..
wild onion	xo	..	xx	x	..	x	..
woodsorrel, yellow	xo	xo	xo	x	x	xx	xx
yarrow	xo	..	x	x	x	xx	..

NOTES:
.. Lack of a rating for herbicide weed combinations indicates that information was not available at time of publication.
x Usually provides adequate weed control.
xx Multiple applications may be necessary for control.
xo May only provide partial weed control.
* May be controlled with postemergence applications of DCPA.

Contact herbicides kill plant parts covered by the chemical. *Systemic herbicides,* absorbed by plant organs and translocated throughout the plant, may be either *selective,* killing certain weeds without injuring desirable grasses, or *nonselective,* controlling all vegetation.

Glyphosate, a nonselective herbicide, is useful in renovating turfs infested with extensive populations of annual weeds. Glyphosate is also used to kill perennial

Table 1b. — Preemergence Control for Selected Broadleaf Weeds

Apply these herbicides prior to weed seed germination. Read and follow label directions for appropriate turfgrasses species, timing, and application rates.

Herbicide	Weeds Controlled	Comments
isoxaben (Gallery)	Many (see label for recommendations)	Do not use on putting greens.

The following preemergence herbicides are commonly used to control annual grasses in turf. They have also been shown to have some control activity on the broadleaf weeds listed.

Herbicide	Weeds Controlled	Comments
DCPA (Dacthal)	spotted and prostrate spurge	Do not use on putting greens or putting green height bentgrasses. Second application may be necessary.
pendimethalin (LESCO Pre-M, Scotts Turf Weedgrass Control)	prostrate spurge, yellow wood sorrel, knotweed, chickweed, henbit	Avoid use on bentgrass. Second application may be necessary.
oxadiazon (Ronstar)	yellow woodsorrel	Avoid use on wet turf, red fescue, and creeping bentgrass.

weedy grasses, such as quackgrass, that cannot be controlled by selective herbicides. Because glyphosate has no residual soil activity, treated areas may be reseeded soon after application. Mecoprop is a selective herbicide used to control broadleaf weeds in turf.

Soil sterilants are chemicals that render the soil toxic to all plant life. How long the soil remains sterile depends upon the material used, the rate of application, and the prevailing environmental conditions that affect decomposition of the herbicide in the soil. Soil sterilants have no place in turfgrass management; however, they are useful in preventing plant growth under fences and other areas that are difficult to mow.

Herbicides may be applied to prevent weeds from infesting a turf or to control weeds already present. Bensulide is a *preemergence* herbicide applied in spring to prevent development of crabgrass. Once the weed has germinated, DSMA may be used as a *postemergence* treatment to selectively control the crabgrass invader.

INSECT CONTROL

Insecticides are pesticides that reduce insect populations below levels injurious to turf. Most commonly used materials are contact poisons. Effective control depends on ensuring contact between insect and insecticide. Control of soil insects (such as grubs) is achieved by drenching the insecticide into the soil, whereas foliar-feeding insects (e.g., sod webworms) are controlled by foliar sprays with no irrigation or rainfall for at least 24 hours afterwards.

Most insecticides are applied after early signs of injury are observed. No insecticide controls all turf pests. Identify the specific insect before attempting control with an insecticide. Learn to recognize early signs of injury to avoid large-scale loss of turf.

Herbicide Trade Names for Broadleaf Weed Control in Turf[a]

2,4-D
Amine 40, Decamine 4D, Dymec Turf Herbicide, Four Power, LESCO A-4D, Turf Weedestroy-D, Weedone LV4, Weedar 64

Mecoprop (MCPP)
Lescopex, MCPP Green, Mecomec, Weedestroy MCPP, Weedone MCPP

dicamba
Banex, Banvel, ProTurf K-O-G Weed Control

chlorflurenol
Break-Thru

triclopyr
Turflon Amine, Turflon Ester

2,4-D + dicamba
Four Power Plus, Triple "D", LESCO Eight-One Selective Herbicide, Super D Weedone, 101 Weedkiller, 81 Selective WeedKiller

2,4-D + mecoprop
Lescopar, Riverdale Granular Lawn Weed Killer, 4-D Amine, MCPP+2, 2 Plus 2 (MCPP + 2,4-D Amine), 2 MCPP + 2D Amine, Turf Kleen

2,4-D + dichlorprop (2,4-DP)
Agway Granular Lawn Weedkiller, LESCO Granular Herbicide, Weedone DPC, Weedone DPC Amine

2,4-D + triclopyr
Turflon D, Turflon II Amine

2,4-D + mecoprop + dicamba
LESCO Three Way, MecAmine-D, Three-Way Lawn Weed Killer, Trex-San, Trimec

2,4-D + dichlorprop + dicamba
Super Trimec

2,4-D + mecoprop + dichlorprop
Triamine Lawn Weedkiller, Weedestroy Triamine, Weedestroy Tri-ester

triclopyr + chlorpyralid
Confront

isoxaben
Gallery

DCPA
Dacthal

pendimethalin
LESCO Pre-M, Scotts Turf Weedgrass Control

oxadiazon
Ronstar

[a] This is not an exhaustive list of trade names for herbicides used on turf. We will amend this list in future reprints if we are notified of products with similar composition.

Label registrations can change at any time. Thus, the recommendations in this circular may become invalid. The user is encouraged to carefully read and follow the most recent label and follow all directions and restrictions. Purchase only enough pesticide for the current growing season.

DISEASE CONTROL

Fungicides kill or inhibit the growth of fungi. Fungicides are of two general types: protective-contact and systemic.

Protective-contact fungicides are applied to seed, foliage, or soil to keep disease-causing fungi from entering grass plants. They must be applied at 5- to 14-day intervals since mowing, rain, and irrigation soon remove much of the surface chemical. Relatively high spray volumes (3 to 5 gal. water per 1,000 sq. ft.) supplies uniform coverage of the foliage. A surfactant added to the spray increases coverage. Many turf fungicides are the protective-contact type. Examples of protective-contact fungicides include: Calo-Clor and Calo-Gran; captan; Chipco 26019; Daconil and Thal-O-Nil; Dyrene, Lescorene, or Dymec; ethazole (Koban, Terrazole); maneb; mancozeb, Lesco 4, or Fore; PCNB (Terraclor, Turfcide); and thiram (Thiramad, Spotrete).

Systemic fungicides are absorbed and distributed within plants destroying established infections and controlling certain diseases for several weeks or months. These fungicides are absorbed principally by the roots and should be drenched or watered in. Examples of systemic fungicides include: Aliette, Apron, Banner, Bayleton, Cleary 3336, Fungo 50, Rubigan, Subdue, Teremec SP and Terraneb SP, Tersan 1991, and Vorlan.

Combinations of protective-contact and systemic fungicides include Bromosan and Duosan.

Table 2. — Herbicides for Control of Selected Annual Grassy Weeds in Turf

Herbicides listed below are used to control annual grasses in turf. Always follow the label directions for application rates and proper timing. For extended preemergent control of annual grass weeds, apply a second application 6 weeks after initial application at ½ the original rate. The common name of the chemical is listed first; the names in parentheses are trade names.

	Preemergent	Postemergent	Annual bluegrass	Crabgrass, foxtails, barnyardgrass	Goosegrass	Remarks
benefin (Balan)	x	. .	ls	es	. .	Avoid use on bentgrass.
benefin and trifluralin (Team)	x	. .	ls	es	. .	Avoid use on bentgrass.
bensulide (Betasan)	x	. .	ls	es	. .	
DCPA (Dacthal)	x	. .	ls	es	es, ej	May injure fine-leaf fescues or bentgrass, especially Cohansey or Toronto. Goosegrass is difficult to control; complete control is rarely achieved. Better control may result if an early application is followed by a second at half the rate in early June.
ethofumesate (Prograss)	x	x	es, ls	. .	. .	See label for specific uses.
fenoxaprop (Acclaim)	. .	x	. .	*	*	Avoid use on bentgrass and young Kentucky bluegrass. May injure some mature Kentucky bluegrass cultivars.
oxadiazon (Ronstar)	x	. .	. .	es	es	Avoid use on red fescue, bentgrass, and wet turf.
organic arsenicals (DSMA — Arrhenal, Weed-E-Rad 360; and MSMA — Arsonate, Daconate 6, Weed Hoe)	. .	x	. .	*	*	May discolor turfgrass. Apply soon after emergence. May require three applications at 7- to 10-day intervals.
pendimethalin (Scotts Turfgrass Weed Control, LESCO Pre-M)	x	. .	ls	es	. .	Avoid use on bentgrass and annual bluegrass turf.
siduron (Tupersan)	x	. .	. .	es	. .	May injure some bentgrasses or fine fescues. Do not use on Bermudagrass. Can be used at ½ rate in conjunction with bluegrass seeding.

es — Apply in early spring before weed emergence.
ls — Apply in late summer.
ej — Apply in early June.
* — See label for appropriate rates and timing of application.

Table 3a. — Nonselective Postemergence Herbicides for Control of Perennial Grassy Weeds in Turf[a]

Use nonselective postemergence herbicides for spot control only. Nonselective herbicides will kill or damage desirable turf.

Weeds	Control	Comments
e.g., nimblewill, bentgrass bermudagrass, quackgrass, tall fescue	amitrole (Amitrol-T)	May persist in soil up to 4 weeks. Do not plant new turf in treated areas for 4 weeks following application.
	dalapon (Dalapon 85, Dowpon M)	May persist in soil up to 6 weeks. Do not plant new turf in treated areas for 6 weeks following application.
	glyphosate (Roundup, Kleenup)	Has no residual activity in soil; seeding can follow treatment immediately. However, it is suggested to wait 1 week to allow translocation of the herbicide. Repeat applications of glyphosate may be required for complete control.

[a] Apply these herbicides when weeds are actively growing.

Table 3b. — Selective Postemergence Herbicides for Control of Perennial Grassy or Grasslike Weeds in Turf[a]

Weeds	Control	Comments
tall fescue	chlorsulfuron (LESCO TFC)	For spot treatment with hand-held sprayer in established Kentucky bluegrass, fine fescues, and bentgrass (mowed taller than ½ inch). Avoid using when drift may occur. For nonselective tall fescue control in perennial ryegrass, use amitrole, dalapon, or glyphosate.
yellow nutsedge	bentazon (Basagran)	Apply soon after emergence to actively growing nutsedge. Repeat applications may be necessary up to a total of 3 lb. a.i./A. per season.

[a] Apply these herbicides when weeds are actively growing.

Table 4. — Chemical Control of Turfgrass Diseases

Diseases[a]	Principal turfgrasses affected	Normal season and intervals of application	Fungicide preparations (oz. per 1,000 sq. ft.)[b]
"Helminthosporium" diseases			
Leaf spot, Melting-out (*Drechslera poae*)	Kentucky bluegrass	March-June; Sept.-Nov. 7 to 21 days	Bromosan-F (5 to 8 fl. oz.) Chipco 26019 WP 50% or FLO (2 to 4 oz.) Daconil 2787 WP 75% or 500L (3 to 11 oz.) Duosan WP 75% (3 to 6 oz.) Dyrene 4F or Dymec WP 50% (2 to 4 oz.) Fore or Formec 80 WP 80% (4 to 6 oz.) PCNB (Terraclor) WP 75% (see label) Vorlan WP 50% (2 oz.) Turfcide 10G (5 to 7½ lb.) Turfcide 24% EC (1 to 1½ qt.) maneb, 80% WP (3 to 8 oz.) mancozeb, 80% WP (3 to 8 oz.) mancozeb 4L, 37%L (5 to 14 fl. oz.)
Leaf spot, crown and root rot (*Bipolaris sorokiniana*)	All turfgrasses	May-Oct. 7 to 21 days	
Zonate eyespot (*Drechslera gigantea*)	Bermudagrass Bluegrasses Bentgrasses	June-Sept. 7 to 21 days	
Net blotch, crown and root rot (*Drechslera dictyoides*)	Fescues Ryegrasses	March-July 7 to 21 days	
Brown blight (*Drechslera siccans*)	Ryegrasses	April-June 7 to 21 days	
Leaf blotch (*Bipolaris cynodontis*)	Bermudagrass	March-June 7 to 21 days	
Red leaf spot (*Drechslera erythrospila*)	Bentgrasses	April-Sept. 7 to 21 days	
Summer patch and necrotic ring spot (*Magnaporthe paae* and *Leptosphaeria korrae*)	Bentgrasses Bluegrasses Fescues Ryegrasses Bermudagrass	April-Sept. (see labels)	Banner L 14.3% (4 fl. oz.) *or* Rubigan A.S. 11%L (2 to 8 fl. oz.) *plus* Bayleton DP 25% (2 to 4 oz.), Chipco 26019 WP 50% or FLO (4 to 8 oz.), Cleary 3336 (see label), Fungo WP 50% (4 to 8 oz.), Tersan 1991 WP 50% (5 to 8 oz.), or Topsin M (see label)

Comments: Apply when disease is expected or first appears. Repeat in 14 to 30 days if necessary. Drench fungicide into root zone using ½ inch (300 gal.) to 1 inch (600 gal.) of water per 1,000 sq. ft. Water the turf thoroughly the day before (300 to 450 gal. water per 1,000 sq. ft.).

[a] Causal fungus listed in parentheses.

[b] Denotes either fungicide, coined name, or representative trade names. Mention of a trade name or proprietary product does not constitute warranty of the product and does not imply approval of this material to the exclusion of comparable products that may be equally suitable. Except where indicated, all materials should be applied in 3 to 5 gal. of water per 1,000 sq. ft. Use lower fungicide rates in *preventative* programs, higher rates for *curative* programs. Only one from each recommended group of preparations need be used. Fungicide use and restrictions are subject to change without notice. Always read and follow the current package label instructions and precautions.

Table 4. — Chemical Control of Turfgrass Diseases (continued)

Diseases[a]	Principal turfgrasses affected	Normal season and intervals of application	Fungicide preparations (oz. per 1,000 sq. ft.)[b]
Dollar spot (*Lanzia* and *Moellerodiscus* spp.)	All turfgrasses	May-Nov. 7 to 30 days (see labels)	Banner L 14.3% (1 to 2 fl. oz.) Bayleton DP 25% (1 to 2 oz.) Bromosan-F (4 fl. oz.) Chipco 26019 WP 50% or FLO (2 to 4 oz.) Daconil 2787 WP 75% or 500L (3 to 11 oz.) Duosan WP 75% (3 to 5 oz.) Dyrene 4F or Dymec WP 50% (4 to 8 oz) Rubigan A.S. 11%L (¾ to 1½ fl. oz.) Vorlan WP 50% (1 to 2 oz.)
Red thread or pink patch (*Laetisaria fuciformis* and *Limonomyces roseipellis*)	All turfgrasses	April-June; August-Nov. 7 to 30 days (see labels)	
Comments: Resistance to benomyl, thiophanate materials, Dyrene, and other fungicides has been reported in some areas. Using combinations of active ingredients or alternating between products is advisable.			
Rhizoctonia brown patch or blight (*R. solani*)	All turfgrasses	May-Oct. 5 to 21 days (see labels)	Banner L 14.3% (2 to 4 fl. oz.) Chipco 26019 WP 50% or FLO (2 to 4 oz.) Daconil 2787 WP 75% or 500L (3 to 11 oz.) Duosan 75% WP (4 to 6 oz.) Dyrene 4F or Dymec WP 50% (4 to 8 oz.) Fungo WP 50% (2 to 3 oz.) Rubigan A.S. 11%L (1½ fl. oz.) + Daconil 2787 or Chipco 26019 (see labels) Tersan 1991 WP 50% (1 oz.) + Daconil 2787 (see label) Vorlan WP 50% (2 oz.) + Fungo WP 50% (2 oz.)
Rusts: leaf and stem (*Puccinia* spp.)	All turfgrasses, especially certain cultivars of Kentucky bluegrass, Perennial ryegrass, Zoysiagrass, and Bermudagrass	June-Oct. 7 to 28 days (see labels)	Banner L 14.3% (1 to 2 fl. oz.) Bayleton DP 25% (1 to 2 oz.) Daconil 2787 WP 75% or 500L (6 to 11 oz.) Duosan WP 75% (4 to 6 oz.) Dyrene 4F or Dymec WP 50% (4 to 8 oz.) maneb (see label) mancozeb 4L, 37%L (5 to 7 fl. oz.)
Anthracnose (*Colletotrichum graminicola*)	All turfgrasses, especially annual bluegrass	May-Oct. 7 to 30 days (see labels)	Banner L 14.3% (1 to 2 fl. oz.) Bayleton DP 25% (2 oz.) Daconil 2787 WP 75% or 500L (5 to 11 oz.) Duosan WP 75% (3 to 5 oz.) Fungo WP 50% (2 oz.) + Vorlan WP 50% (2 oz.) Rubigan A.S. 11%L (1¾ to 3½ fl. oz.) Tersan 1991 WP 50% (1 to 2 oz.)
Leaf smuts Stripe smut (*Ustilago striiformis*) Flag smut (*Urocystis agropyri*)	All turfgrasses, especially certain bentgrasses, bluegrasses, and ryegrasses	Oct.-Nov. (see labels)	Banner L 14.3% (1 to 2 fl. oz.) Bayleton DP 25% (2 oz.) *or* Fungo WP 50% (6 to 8 oz.) *or* Rubigan A.S. 11%L (15 fl. oz.) *or* Tersan 1991 WP 50% (6 to 8 oz.) *plus* PCNB (Terraclor) WP 75% (see label)
Comments: Make one or two applications, 14 to 21 days apart. Drench fungicide into soil, using 1 inch (600 gal.) water per 1,000 sq. ft., immediately after application.			
Powdery mildew (*Erysiphe graminis*)	Bluegrasses Bermudagrass Fescues	March-Nov. 7 to 30 days (see labels)	Banner L 14.3% (1 to 2 fl. oz.) Bayleton DP 25% (1 to 2 oz.) Rubigan A.S. 11%L (2 to 4 fl. oz.)
Snow molds Typhula blight (*T.* species) Fusarium patch (*Microdochium nivalis*)	All turfgrasses	Nov.-March see labels for interval	Bayleton DP 25% (4 oz.) Chipco 26019 WP 50% or FLO (2 to 8 oz.) Calo-Clor, Calo-Gran (see label)[c] Daconil 2787 WP 75% or 500L (8 to 16 oz.) Rubigan A.S. 11%L (8 fl. oz.) Teremec SP or Terraneb SP WP 65% (6 to 9 oz.) *plus* PCNB (Terraclor) WP 75% (8 oz.)
Pythium blight, grease spot, spot blight (many *P.* species)	All turfgrasses	April-Nov. 5 to 21 days (see labels)	Banol L 66.5% (1⅓ to 4 fl. oz.) Koban 30% WP (2 to 8 oz.) Subdue 2E (1 to 2 fl. oz.) Terrazole WP 35% (4 to 8 oz.) Teremec SP or Terraneb SP WP 65% (4 to 6 oz.) Chipco Aliette WP 80% (4 to 8 oz.)

[c] Cleared for use *only* on golf course greens, aprons, and tees by certified golf course superintendents.

Table 4. — Chemical Control of Turfgrass Diseases (continued)

Diseases[a]	Principal turfgrasses affected	Normal season and intervals of application	Fungicide preparations (oz. per 1,000 sq. ft.)[b]
Fairy rings (*Marasmius oreades, Agaricus* or *Psalliota campestris, Chorophyllum* [*Lepiota*] species, *Trechispora alnicola*)	All turfgrasses		methyl bromide chloropicrin Vapam Soil Fumigant Vorlex or Vorlex 201 formaldehyde
Comments: Soil temperature should be above 60°F. for fumigation. Cover area with gasproof cover for several days, *or* instead of treating with a soil fumigant, use root feeder attachment on hose to drench rings with water. Repeat when symptoms reappear.			
Seed rot, damping off, seedling blights (*Pythium* sp., *Fusarium* sp., *Rhizoctonia solani, Drechslera* and *Bipolaris* spp.; *Colletotrichum graminicola*)	All turfgrasses	Treat seed before planting.	captan *or* thiram 50% or 75%, *plus* Koban WP 30% *or* Apron 25W
		Spray just after seeding, at early seedling emergence, and 7 to 14 days later (see labels).	Koban WP 30%, Banol L 14.3%, Subdue 2E, or Terrazole WP 35% *plus one of these:* captan WP 50% Chipco 26019 WP 50% Dyrene 4F *or* Dymec WP 50%
Nematodes (many genera and species)	All turfgrasses	fenamiphos [Nemacur or 10G] (except zoysia) or ethoprop [Mocap 10G, Nematicide-Insecticide, Proturf Nematicide-Insecticide] (except bentgrass).	
Comments: Follow the manufacturer's directions carefully. Follow nematicide *immediately* with at least ½ inch of water to ensure penetration into soil to prevent toxic effects. Treat in fall or spring (or both, if nematodes are a serious problem) when soil temperature is above 55°F. Make no more than two applications per year. Aerifying turf before application improves results. *Do not apply to newly seeded areas.* For use only by certified pesticide applicators.			
Slime molds (*Physarum cinereum, Fuligo* sp., *Mucilago spongiosa, Stemonitis* spp.)	All turfgrasses	May-Sept. Mow, rake, pole, or hose down to remove mold when seen. Controlled by any fungicide listed for "Helminthosporium" diseases.	
Algae, green or black scum	All turfgrasses	Apply when first seen; reapply as needed.	copper sulfate (1 to 2 oz.) Daconil 2787 WP 75% or 500 (4 to 11 oz.) mancozeb WP 80% (6 oz.)
Moss	All turfgrasses	Apply when first seen; reapply as needed.	ferrous ammonium sulfate (1 to 4 lbs.) ferric sulfate (1 to 4 lbs.)

[a] Causal fungus listed in parentheses.

[b] Denotes either fungicide, coined name, or representative trade names. Mention of a trade name or proprietary product does not constitute warranty of the product and does not imply approval of this material to the exclusion of comparable products that may be equally suitable. Except where indicated, all materials should be applied in 3 to 5 gal. of water per 1,000 sq. ft. Use lower fungicide rates in *preventative* programs, higher rates for *curative* programs. Only one from each recommended group of preparations need be used. Fungicide use and restrictions are subject to change without notice. Always read and follow the current package label instructions and precautions.

Table 5. — Chemical Control of Insects

Insect	Insecticide[a]	Formulation[b]	Suggestions
Annual white grubs	diazinon trichlorfon (Dylox, Proxol) isofenphos (Oftanol) bendiocarb (Turcam) isozofos (Triumph)	EC or G SP or G G or EC WP EC	Sample for grubs in several areas of infested turf. Ten to 12 grubs or more per square foot are necessary to justify treatment. Apply as spray or granules to a small area and then drench in thoroughly before treating another small area. White grub damage will usually occur in August through October. Diazinon is not labeled for use on golf courses and sod farms. Triumph is labeled for use only on home lawns, sod farms, golf course tees, greens, and aprons.
Ataenius grubs	trichlorfon (Dylox, Proxol) isofenphos (Oftanol) bendiocarb (Turcam) isozofos (Triumph)	SP or G G or EC WP EC	Apply as spray or granules and drench into infested soil. Fifty or more ataenius grubs per square foot are necessary for damage to high-quality turfgrass. Triumph is labeled for golf course greens, tees, and aprons. Damage first appears in mid-June to early July and again in late August.

[a] Use one of the insecticides recommended for a given group of insects, being sure to use the proper dosage for the formulation chosen. Follow labels as to correct rate of application.

[b] EC = emulsion concentrate; WP = wettable powder; G = granules; SP = soluble powder.

Table 5. — Chemical Control of Insects (continued)

Insect	Insecticide[a]	Formulation[b]	Suggestions
Billbugs	chlorpyrifos (Dursban) isofenphos (Oftanol)	EC EC or G	Billbugs are a problem in turfgrass only in a few counties in Illinois. These locations are in the greater Chicago area and East St. Louis area. Control adult billbugs in April with a foliage treatment. Drench treatment into soil in June or July for larval control.
Cicada killer and other soil-nesting wasps Ants	diazinon chlorpyrifos (Dursban)	EC EC	Apply as spray or granules and water in thoroughly. For individual nests pour 1% diazinon in nest and seal in with dirt.
Sod webworms Armyworms Cutworms	carbaryl (Sevin) diazinon chlorpyrifos (Dursban) trichlorfon (Dylox, Proxol)	WP or G EC or G EC or G SP or G	Webworms usually damage lawns in late July and August. Two or more webworms per square foot can cause damage to turf. Apply as a spray using at least 2½ gal. per 1,000 sq. ft.; as granules, apply with fertilizer spreader and activate by watering.
Millipedes and sowbugs	carbaryl (Sevin) diazinon	WP or G EC or G	Spray around home where millipedes or sowbugs are crawling. If numerous, treat entire lawn.
Chinch bugs	chlorpyrifos (Dursban) diazinon trichlorfon (Dylox, Proxol)	EC EC SP	Spray infested areas in lawn where chinch bugs are present. Detect bugs by drenching small turf areas with water, causing the bugs to crawl up on the grass blades.
Greenbug	acephate (Orthene) chlorpyrifos (Dursban)	EC EC	Spray grass thoroughly if rust-colored grass appears and greenbugs are numerous at the edge of these areas.
Slugs	Mesurol	bait	Apply where slugs are numerous. Scatter in grass.

[a] Use one of the insecticides recommended for a given group of insects, being sure to use the proper dosage for the formulation chosen. Follow labels as to correct rate of application.
[b] EC = emulsion concentrate; WP = wettable powder; G = granules; SP = soluble powder.

RECORD OF PESTICIDE APPLICATIONS

Date	Chemical	Turf treated	Dosage	Remarks

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